Figure 5c illustrates a cutting loop 182 very similar to cutting loop 176, except that the portion 184 of the cutting loop immediately adjacent actuating portion 140 (not illustrated) bends away from the rest of the cutting loop. Portion 184 is bent away in this manner in order to extend cutting loop 182 even farther out of cannula 102 when the cutting wire is rotated out of the inner cannula 116 and the outer cannula 152.

Figure 5d illustrates a cutting loop 186 in accordance with yet another embodiment. Cutting loop 186 includes an end 188, two radial legs 190, 192, and a middle portion 194 between the radial legs. Middle portion 194, as illustrated in Figure 5d, curves along a radius R_C, although middle portion can alternatively extend linearly between radial legs 190, 192. Radial legs 190, 192 extend generally linearly, so that when cannula 102 is used to gather a plurality of tissue samples around the cannula, the unsampled space around the cannula is minimized.

Cutting loops herein are formed of a material so that the cutting loops can be used as a RF energy cutting loop. Preferably, the cutting loops are formed of stainless steel, tungsten, platinum, or nickel-titanium alloy wire.

Figures 6a and 6b illustrate two embodiments of an end plug. In Figure 6a, an end plug 194 includes a mushroom-shaped body 196 having a dome-shaped head 198 and a cylindrical base 200. End plug 194 is formed of a medical grade polymer, preferably high density polyethylene (HDPE). A cutting wire 202 is attached to head 198 on radially opposite sides of the head, and is embedded in the head at a free end 204 and a connecting portion 206. Connecting portion 206 extends through base 200, and terminates at a connector 208. Connector 208 is positioned on base 200 so that it lines up with and is in physical and electrical contact with conductor 150 in inner cannula 116 when end plug 194 is assembled with inner cannula 116 and outer cannula 152. Cutting wire 202 is formed of a material which allows the cutting wire

to act as a RF cutting element when assembled with inner cannula 116 and when RF generator 106 is connected to the proximal end of conductor 150.

Cutting wire 202 is provided distal of the distal end 210 of end plug 194 so that cannula 102 can be easily inserted into tissue, the RF energy from RF generator 106 passing through conductor 150 and to cutting wire 202. Cutting wire 202 creates a slit in the tissue into which it is pressed, which allows cannula 102 to advance into tissue and to a site at which a tissue sample is desired, with a minimum of trauma to the patient. The use of cutting wire 202 also is advantageous because the RF cutting which is provided therewith allows entry of cannula 102 into target tissue to be made with much less pushing force than prior devices, and in particular than prior devices which rely on a sharpened or pointed cannula for entry into a target tissue. Similarly advantageous is that the use of RF energy cutting wires, including cutting wire 202 and cutting loops 138, 176, 182, and 186, may lead to significant reductions in bleeding.

Figure 6b illustrates an end plug 212 in accordance with yet another exemplary embodiment. End plug 212 is substantially similar to end plug 194, and therefore only the differences between end plug 194 and end plug 212 will be described. Instead of connector 208, end plug 212 includes a connector loop 214 which extends out of and then returns back into base 200. Connector loop 214 is shaped and sized to make physical and electrical contact with a cutting loop as described above, so that the cutting loop can act as a RF energy conductor for cutting wire 202 in the place of a conductor 150 extending through inner cannula 116. In Figure 6b, cutting loop 138 is illustrated, although any of the cutting loops described herein can alternatively be used; connector loop 214 is shaped and sized to make electrical contact with the cutting loop with which it is intended to be used. To utilize the advantages of end plug 212, cutout 124 in inner cannula 116 should extend to the distal end of the inner cannula, so that the cutting loop can extend to the end plug.

According to yet another embodiment (not illustrated), connector loop 214 can be replaced by an electrically conductive plate positioned on the proximal end surface of end plug 212, and electrically connected to connecting portion 206. A plate is advantageously used so that a single design of end plug can be used with any cutting loop, because such a plate makes physical and electrical contact with cutting loops having any point which will contact the plate.

Figure 7 illustrates a schematic perspective view of portions of inner cannula 116, outer cannula 152, and an end plug 194 or 212, assembled together as cannula 102. Outer cannula 152 preferably includes a mesh, screen, or array 216 including a plurality of openings 218 through sidewall 160 of the outer cannula. Screen 216 is provided along outer cannula 152 proximal of cutout 162, for aspirating any vapors 220, including smoke and odors, which may be evolved during the use of the RF cutting elements of cannula 102. Vapors 220 which travel proximally along cannula 102 and which exit an opening in the tissue 222 being sampled can be aspirated through openings 218 and into main lumen 122 of inner cannula 116. Inner cannula 116 is also provided with a mesh, screen, or array through its sidewall 126, as described in greater detail below with reference to Figure 8.

Figure 8 illustrates a perspective view of proximal portions of inner cannula 116, proximal of the portions illustrated in Figure 2. Inner cannula 116 includes a mesh, screen, or array 224 through sidewall 126. Sidewall 126 is preferably provided with a longitudinally extending recess 226 which extends partially through sidewall 126, and in which screen 224 is formed. Similar to screen 216 described above, screen 224 communicates main lumen 122 of inner cannula 116 with the exterior of the inner cannula. When inner cannula 116 is positioned in main lumen 172 of outer cannula 152, screen 224 lies under screen 216, so that vacuum that is applied to main lumen 122 of the inner cannula is effective to aspirate vapors through both screens